

Repland by

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CLAIMS:

1. An improved process for making a structural foamed polymer comprising the steps of dispersing a gas-producing material into a fluid polymer at a first pressure followed by a second pressure less than the first pressure, the difference between the first  
5 pressure and the second pressure being sufficient to generate bubbles of gas in the fluid polymer, wherein the improvement comprises the step of: dispersing a multi-layered silicate material with the polymer so that the polymer has dispersed therein single layers of silicate material, double layers of silicate material, triple layers of silicate material, four layers of  
10 silicate material, five layers of silicate material and more than five layers of silicate material, the volume percent of the one, two, three, four and five layers of silicate material being greater than the volume percent of the more than five layers of silicate material.

2. An improved structural foamed polymer comprising gas cells having polymer walls, wherein the improvement comprises: the polymer having dispersed therein single layers of silicate material, double layers of silicate material, triple layers of silicate  
15 material, four layers of silicate material, five layers of silicate material and more than five layers of silicate material, the volume percent of the one, two, three, four and five layers of silicate material being greater than the volume percent of the more than five layers of silicate material.

3. An improved process for making a multilayer polymer film, sheet or tube comprising the step of coextruding layers of at least two different polymers or at least two  
20 different layers of the same polymer to form the multilayer polymer film, sheet or tube, wherein the improvement comprises the step of: dispersing a multi-layered silicate material with at least one polymer so that the at least one polymer has dispersed therein single layers of silicate material, double layers of silicate material, triple layers of silicate material, four  
25 layers of silicate material, five layers of silicate material and more than five layers of silicate material, the volume percent of the one, two, three, four and five layers of silicate material being greater than the volume percent of the more than five layers of silicate material.

4. An improved multilayer polymer film, sheet or tube comprising layers of at least two different polymers or at least two layers of the same polymer, wherein the  
30 improvement comprises: at least one polymer having dispersed therein single layers of silicate material, double layers of silicate material, triple layers of silicate material, four layers of silicate material, five layers of silicate material and more than five layers of silicate

material, the volume percent of the one, two, three, four and five layers of silicate material being greater than the volume percent of the more than five layers of silicate material.

5. The improved process of Claim 3, wherein the number of layers is ten or more.

5 6. The improved film, sheet or tube of Claim 4, wherein the number of layers is ten or more.

7. An improved pultrusion process comprising the steps of impregnating a reinforcing fiber bundle with a polymer and forming a structural profile, wherein the improvement comprises the step of: dispersing a multi-layered silicate material with the polymer so that the polymer has dispersed therein single layers of silicate material, double layers of silicate material, triple layers of silicate material, four layers of silicate material, five layers of silicate material and more than five layers of silicate material, the volume percent of the one, two, three, four and five layers of silicate material being greater than the volume percent of the more than five layers of silicate material.

10 8. An improved pultrusion structural profile comprising a reinforcing fiber bundle impregnated with a polymer, wherein the improvement comprises: the polymer having dispersed therein single layers of silicate material, double layers of silicate material, triple layers of silicate material, four layers of silicate material, five layers of silicate material and more than five layers of silicate material, the volume percent of the one, two, three, four and five layers of silicate material being greater than the volume percent of the more than five layers of silicate material.

15 9. An improved compression molding process comprising the step of compression molding an extruded fiber reinforced polymer pre-form; wherein the improvement comprises the step of: dispersing a multi-layered silicate material with the polymer so that the polymer has dispersed therein single layers of silicate material, double layers of silicate material, triple layers of silicate material, four layers of silicate material, five layers of silicate material and more than five layers of silicate material, the volume percent of the one, two, three, four and five layers of silicate material being greater than the volume percent of the more than five layers of silicate material.

25 10. An improved article, the article made by compression molding an extruded fiber reinforced polymer pre-form, wherein the improvement comprises: the polymer having dispersed therein single layers of silicate material, double layers of silicate material, triple layers of silicate material, four layers of silicate material, five layers of silicate material, and more than five layers of silicate material, the volume percent of the one, two, three, four and five layers of silicate material being greater than the volume percent of the more than five layers of silicate material.

material and more than five layers of silicate material, the volume percent of the one, two, three, four and five layers of silicate material being greater than the volume percent of the more than five layers of silicate material.

11. An improved process for making strand foamed polymer comprising the steps of extruding a polymer through a plurality of openings to form strands and then coalescing the strands, wherein the improvement comprises the step of: dispersing a multi-layered silicate material with the polymer so that the polymer has dispersed therein single layers of silicate material, double layers of silicate material, triple layers of silicate material, four layers of silicate material, five layers of silicate material and more than five layers of silicate material, the volume percent of the one, two, three, four and five layers of silicate material being greater than the volume percent of the more than five layers of silicate material.

12. An improved strand foamed polymer article, wherein the improvement comprises: the polymer having dispersed therein single layers of silicate material, double layers of silicate material, triple layers of silicate material, four layers of silicate material, five layers of silicate material and more than five layers of silicate material, the volume percent of the one, two, three, four and five layers of silicate material being greater than the volume percent of the more than five layers of silicate material.

13. An improved SCORIM process for molding a polymer into an article comprising the step of introducing the polymer into a mold by reciprocating flow, wherein the improvement comprises the step of: dispersing a multi-layered silicate material with the polymer so that the polymer has dispersed therein single layers of silicate material, double layers of silicate material, triple layers of silicate material, four layers of silicate material, five layers of silicate material and more than five layers of silicate material, the volume percent of the one, two, three, four and five layers of silicate material being greater than the volume percent of the more than five layers of silicate.

14. An improved SCORIM molded polymer article, wherein the improvement comprises: the polymer having dispersed therein single layers of silicate material, double layers of silicate material, triple layers of silicate material, four layers of silicate material, five layers of silicate material and more than five layers of silicate material, the volume percent of the one, two, three, four and five layers of silicate material being greater than the volume percent of the more than five layers of silicate material.

15. The improved process of Claims 1, 3, 5, 7, 9, 11 and 13, further including the step of aligning the planes of the one, two, three, four and five layers of silicate material so that more than one half of the planes have the same orientation within thirty degrees as determined by electron microscopy.

5 16. The improved article of Claims 2, 4, 6, 8, 10, 12 and 14, wherein more than one half of the planes of the one, two, three, four and five layers of silicate material have the same orientation within thirty degrees as determined by electron microscopy.

10 17. The improved process of Claims 1, 3, 5, 7, 9, 11 and 13, wherein the weight percent of the multi-layered silicate material dispersed in the polymer is in the range of from one to twenty percent.

18. The improved process of Claims 1, 3, 5, 7, 9, 11 and 13, wherein the weight percent of the multi-layered silicate material dispersed in the polymer is in the range of from two to ten percent.

15 19. The improved article of Claims 2, 4, 6, 8, 10, 12 and 14, wherein the weight percent of the multi-layered silicate material dispersed in the polymer is in the range of from one to twenty percent.

20. The improved article of Claims 2, 4, 6, 8, 10, 12 and 14, wherein the weight percent of the multi-layered silicate material dispersed in the polymer is in the range of from two to ten percent.